CULTURAL RESOURCES INSPECTION OF FOUR ALTERNATIVE BUILDING SITES FOR GSA COE FACILITIES, TULSA, OKLAHOMA

by

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A cultural resources inspection was conducted of four alternative buildings for a General Sevices Administration (GSA) Corps of Engineers (COE) facility in Tulsa, Oklahoma, on July 11, 1991. The work was undertaken by Geo-Marine, Inc. for the U.S. Army Corps of Engineers, Fort Worth District, in order to meet obligations regarding the protection of significant properties under the National Historical Preservation Act of 1966, as amended (PL-96-515), the Archeological and Historical Preservation Act of 1974, as amended (PL-93-291), the National Environmental Policy Act of 1969 (PL-90-190), and Executive Order #11593, "Protection and Enhancement of the Cultural Environment". Background research was conducted in which both historic and archeological sources were examined in order to determine the nature of the cultural resources which might be present in the project area. Fieldwork involved a walkover and surface examination of the site or general site area, if the site itself could not be specifically located. Extensive notes were taken on soil type, surface topography, drainage pattern, vegetation cover, surface and drainage modification, contextural integrity, and subsurface stratigraphy. In spite of these efforts, no cultural remains were located on any of the four sites, although it is believed that there is some likelihood of buried cultural remains being present on two of the four sites (i.e., Site #1 and Site #2). As a result, it is recommended that should either Site #1 or Site #2 be chosen as the final building site, additional subsurface investigations should be carried out with a backhoe. The other two sites (Site #6 and Site #9) were found to be either heavily disturbed or in a nonalluvial upland setting and no further work is necessary at these sites.

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EXECUTIVE SUMMARY

As part of the process of choosing a final construction site for a proposed General Services Administration (GSA) Corps of Engineers (COE) facility in Tulsa, Oklahoma, the Oklahoma State Archeologist requested that four of the potential building sites located within the Mingo Creek drainage be inspected prior to project construction in order to identify any significant archeological resources that may exist in these project areas. In July of 1991, such an archeological field inspection was conducted by an archeologist with Geo-Marine, Inc., in order that the sponsoring agencies would be in compliance with the National Historical Preservation Act of 1966, as amended (PL-96-515), the Archeological and Historical Preservation Act of 1974, as amended (PL-93-291), the National Environmental Policy Act of 1969 (PL-90-190), and Executive Order #11593, "Protection and Enhancement of the Cultural Environment".

This field inspection which included a surface inspection of the four sites was conducted on July 11, 1991, by Dr. Maynard Cliff. Although these efforts revealed neither prehistoric nor historic properties within the four potential building sites, they did reveal the presence of a buried land surface at Site #1 which may have served as an occupation surface, and of large alluvial areas at Site #2 which could also conceal buried cultural resources. Given a potential for buried cultural remains within these two alternative building sites, it is recommended that should either of these two sites be selected, additional subsurface examination utilizing a backhoe be conducted prior to commencing construction. The other two sites (Site #6 and Site #9) were found to be either heavily disturbed or in a nonalluvial upland setting and no further work is necessary at these sites.

ABSTRACT

A cultural resources inspection was conducted of four alternative building sites for a General Services Administration (GSA) Corps of Engineers (COE) facility in Tulsa, Oklahoma, on July 11, 1991. The work was undertaken by Geo-Marine, Inc. for the U.S. Army Corps of Engineers, Fort Worth District, in order to meet obligations regarding the protection of significant properties under the National Historical Preservation Act of 1966, as amended (PL-96-515), the Archeological and Historical Preservation Act of 1974, as amended (PL-93-291), the National Environmental Policy Act of 1969 (PL-90-190), and Executive Order #11593, "Protection and Enhancement of the Cultural Environment". Background research was conducted in which both historic and archeological sources were examined in order to determine the nature of the cultural resources which might be present in the project area. Fieldwork involved a walkover and surface examination of the site or general site area, if the site itself could not be specifically located. Extensive notes were taken on soil type, surface topography, drainage pattern, vegetation cover, surface and drainage modification, contextual integrity, and subsurface stratigraphy. In spite of these efforts, no cultural remains were located on any of the four sites, although it is believed that there is some likelihood of buried cultural remains being present on two of the four sites (i.e., Site #1 and Site #2). As a result, it is recommended that should either Site #1 or Site #2 be chosen as the final building site, additional subsurface investigations should be carried out with a backhoe. The other two sites (Site #6 and Site #9) were found to be either heavily disturbed or in a nonalluvial upland setting and no further work is necessary at these sites.

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INTRODUCTION

This report presents the results of an archeological field inspection of four potential building sites, reportedly comprising approximately 30 acres of land in the city of Tulsa, Oklahoma. These sites consist of four of a larger number of alternatives for the location of a proposed General Services Administration (GSA) Corps of Engineers (COE) facility to be located in Tulsa.

This work was conducted in accordance with and in partial fulfillment of the U.S. Government obligations under the National Historical Preservation Act of 1966, as amended (PL-96-515), the Archeological and Historical Preservation Act of 1974, as amended (PL-93-291), the National Environmental Policy Act of 1969 (PL-90-190), and Executive Order #11593, "Protection and Enhancement of the Cultural Environment".

The four potential building sites area are all located in the eastern portion of the Tulsa urban area, within the drainage of Mingo Creek, a tributary of Bird Creek to the north (Figure 1). The four potential building sites, from south to north, include:

Site #1 - a presently-vacant tract of land at the northwest corner of the intersection of I-44 and Mingo Valley Expressway, adjoining a small tributary of Mingo Creek.

Site #2 - a tract of land reportedly at the corner of 51st Street South and Garnett Road, within the 100-year frequency floodplain of Mingo Creek and Tributary RB-11.

Site #6 - an undeveloped tract at 3845 South 103rd East Avenue, adjacent to a channelized section of Mingo Creek.

Site #9 - an undeveloped, level site at 11500 East 41st Street, adjacent to a minor upland tributary of Mingo Creek.

The archeological field inspection of these four potential building sites was carried out on July 11, 1991 by a staff archeologist with Geo-Marine, Inc., of Plano, Texas (Dr. Maynard Cliff). This inspection failed to locate any cultural resources, but it is felt that there is some possibility for buried cultural remains to be present at Site #1 and Site #2. As a result, it is recommended that should either Site #1 or Site #2 be chosen as the final building site, additional subsurface investigations be carried out with a backhoe. Site #6 and Site #9 were found to be either heavily disturbed or in a nonalluvial upland setting and no further work is necessary at these sites.

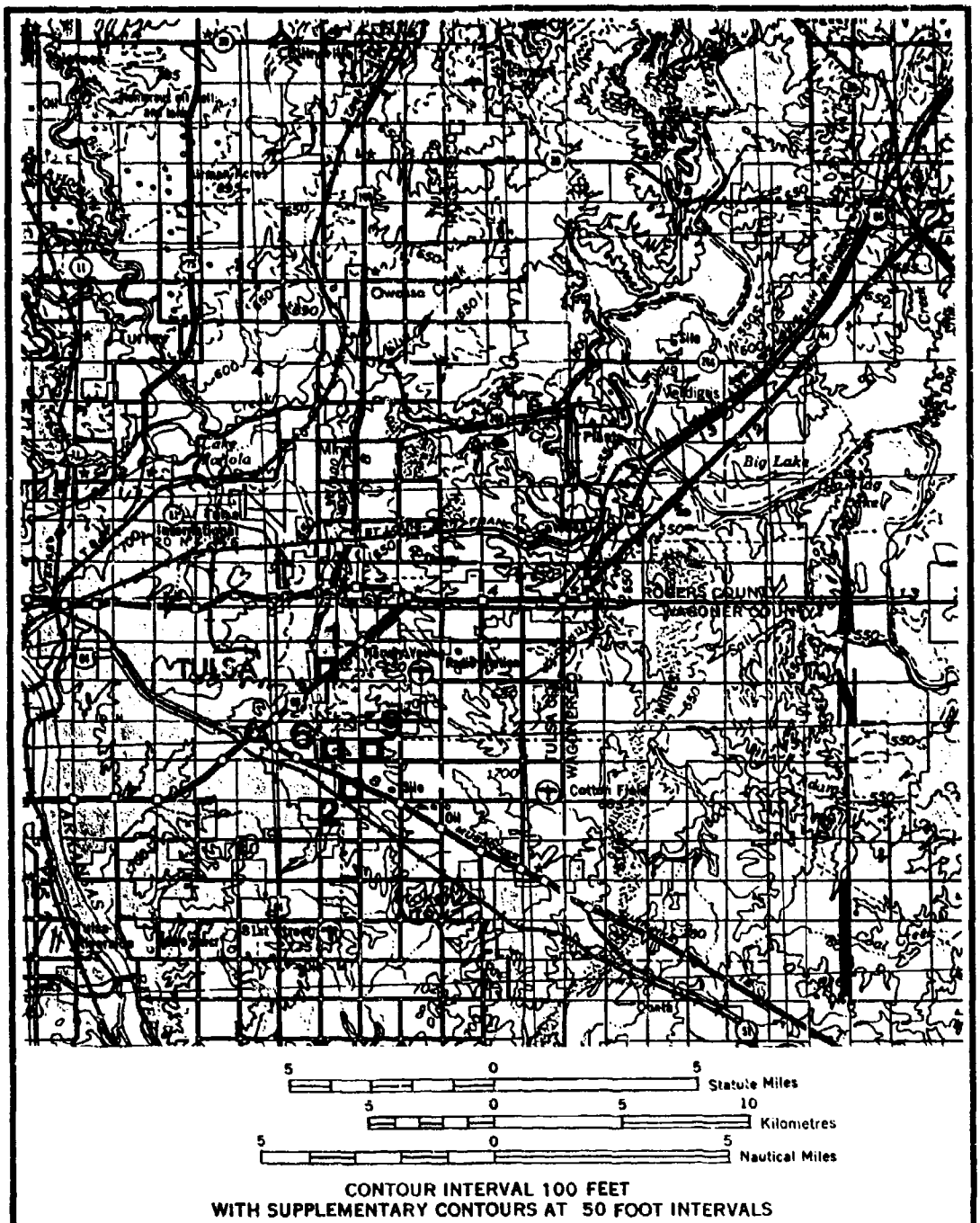

Figure 1. Location of Mingo Creek within the eastern Tulsa area, showing the four potential building sites inspected for this report.

PROJECT BACKGROUND

Environmental Setting

The Mingo Creek drainage lies within the area of what is now the eastern portion of urban Tulsa (see Figure 1), on the boundary between an area of relatively flat plains to the east, and a region of erosional hills to the west. To the east of Tulsa is what is variously known as the Prairie Plains (Morris et al. 1976:Map 3) or the Claremore Cuesta Plains (Albert and Wyckoff 1984:Figure 1.2). This area consists largely of Pennsylvanian shales and limestones, with sandstone remnants forming high cuestas overlooking broad rolling plains (Drass 1985:6). It is a relatively level region with extensive topographic variation caused by erosion. The area was originally dominated by tall grasses, but since climatic conditions are very suitable for agricultural production, today this area is more productive than many other areas of the state, with a great variety of crops grown on smaller-sized fields (Morris et al. 1976:Map 3).

On the other side of Tulsa, to the west, is an area known as the Sandstone Hills (Morris et al. 1976:Map 3) or the Eastern Sandstone Cuesta Plains (Albert and Wyckoff 1984:Figure 1.2). This region consists primarily of Pennsylvanian sandstones in the uplands and shales and limestones in the narrow valleys (Drass 1985:6). It is dominated by broken lines of hills or cuestas which trend in a generally north-south direction with eastward facing escarpments, and which are largely the result of the resistance of the hard sandstones and shales to erosion and weathering.

Soils within the floodplain of Mingo Creek are classified within the Osage-Wynona association which consists of deep, nearly level, poorly drained and somewhat poorly drained, loamy or clayey soils that have a loamy or clayey subsoil over loamy or clayey sediments on floodplains (Cole et al. 1977). Immediately outside the floodplain of Mingo Creek, to both the east and the west, is a mosaic pattern of soils of the Okemah-Parsons association, generally closest to the creek, and soils of the Dennis-Bates association (Cole et al. 1977). The Okemah-Parsons association consists of deep, nearly level, moderately well drained and somewhat poorly drained, loamy soils that have a loamy or clayey subsoil, on uplands. The Dennis-Bates association consists of deep and moderately deep, very gently sloping through sloping, moderately well drained or well drained, loamy soils that have a loamy or clayey subsoil over clayey sediments or sandstone on uplands.

Hydrologically, the project area falls within the Arkansas River Valley. Mingo Creek flows north through the Tulsa area, to a confluence with Bird Creek, which in turn flows east-southeast to join the Verdigris River, a major tributary of the Arkansas (Morris et al. 1976:Map 6). Climatically, the general area can be classified as being moist and subhumid (Drass 1985:5). The Tulsa area has an average January temperature of 36° to 38° F., and an average July temperature of around 82° F. The average annual rainfall is between 965 and 1,016 mm (38 and 40 inches), with between 609 and 661 mm (24 and 26 inches) of this, on average, falling between April and September (Morris et al. 1976:Map 7). The length of the growing season averages between 210 and 220 days per year in this part of Oklahoma, with the first killing frost occurring around October 25-30, and the last killing frost in the spring around March 25-30 (Morris et al. 1976:Map 8).

Biotically, this area has been placed within the Cherokee Prairie district, close to its western border with the Osage Savannah district (Albert and Wyckoff 1984:Figure 1.1). The natural vegetation of the Cherokee Prairie district, in which Mingo Creek is located, is generally dominated by tall grasses, including little bluestem, sideoats grama, Kentucky bluegrass, big bluestem, Indiangrass, and switchgrass. Bottomland woodlands extending into the grassland along watercourses contain a broad range of trees, including american elm, slippery elm, shumard oak, pin oak, common hackberry, black walnut, and pecan (Drass 1985:7-8). Habitat extensions from the east and west mix faunal species more common to the Ozarks with those from the western grasslands. Important native faunal species include: Louisiana white-tailed deer,

pronghorn antelope, elk, american bison, black bear, cougar, timber wolf, red wolf, coyote, peccary, bobwhite quail, Mourning dove, turkey, numerous migratory and water birds, and several varieties of foxes, squirrels, rabbits, and other small mammals (for a complete listing of both floral and faunal resources, see Albert and Wyckoff 1984:Tables 1.3 & 1.4).

The geoarcheology and paleoenvironment of the area has recently been summarized at both the state and regional levels with listings of additional references for the interested reader (Albert and Wyckoff 1984; Artz and Reid 1984; Drass 1985). Drass notes that no extreme environmental fluctuations have occurred over the last 2,000 years, although there apparently have been minor fluctuations in precipitation and plant distributions (Drass 1985:14). Drass charts these changes (1985:Table 2), and shows a period of slightly drier climate than today from about A.D. 1 to A.D. 400, followed by a more mesic period until about A.D. 900, possibly with higher moisture levels than today. What is known as the Copan paleosol may have formed during this period. After about A.D. 900 a period of drier climate began in this area, possibly lasting until after A.D. 1300.

It is especially important to note that the existence of a buried soil horizon, probably related to the Copan paleosol, in cutbanks along Bird Creek near Catoosa and Skiatook, the former downstream and the latter upstream from the confluence with Mingo Creek (Drass 1985:6-7). Near Catoosa, close to the Verdigris River, this paleosol is reported to be 300-400 cm deep, while it is only 80 cm deep near Skiatook. It has been suggested that the Copan paleosol formed subsequent to A.D. 1 in the Copan Lake Area in the Caney Valley, north of Tulsa (Artz and Reid 1984:100-153), and Drass suggests that this dating is also relevant for the paleosol along Bird Creek (Drass 1985:7). Drass goes on to suggest that extensive alluviation beginning after A.D. 1100 covered the Copan paleosol as well as all of the terraces along the lower Bird Creek Valley. Drass also relates that upstream from Skiatook, terrace remnants are still visible, with the Copan paleosol reported as far west as the Birch Creek-Bird Creek confluence, where it is only 25 cm below the surface. An older paleosol has been identified by Henry (1978:55-56) on hillslopes and cutbanks near Hominy Creek (another tributary of Bird Creek with its confluence downstream from Skiatook) but the age of this soil is as yet unknown and Drass feels that it may be deeply buried within the Bird Creek Valley (Drass 1985:7).

Cultural Setting

In preparing this section, several general overviews of Oklahoma and the Southern Great Plains were drawn upon, including Bell and Baerreis (1951), Bell (ed., 1984), and Hofman et al. (1989). A valuable, locally-focused source on the prehistoric remains in the Tulsa area was Drass (1985), while much of the general historic background was drawn from Morris et al. (1976).

Summaries of the history of archeological activity in Oklahoma and in the Southern Plains in general have recently been presented by Albert (1984) and Hofman and Hays (1989). Despite an interest in the archeology of Oklahoma which reaches back to the 1870s and the 1880s, archeological research in what Drass (1985) calls the north central Oklahoma region, an area which appears to include Nowata, Rogers, Washington, Osage, Kay, Noble, Pawnee, and portions of Wagoner, Tulsa, Creek, and Payne Counties, began much later. The first systematic archeology in this area listed by Albert (1984) was that of Joseph B. Thoburn in the 1920s. Thoburn excavated at the Bryson-Paddock site in Kay County (Albert 1984:46). The WPA program of the 1930s resulted in a lot of archeological fieldwork all over Oklahoma which provided the base for later syntheses of the state's prehistory (cf. Bell and Baerreis 1951).

Following World War II, the construction of numerous reservoirs throughout Oklahoma brought with it a need for archeological salvage work. In north central Oklahoma, work was done at Hulah Lake, on the Caney River, in 1949 and at Keystone Reservoir, with branches on the Salt Fork of the Arkansas and on the Cimarron, in 1951 (Bell 1949; Brighton 1952). New federal and state laws and regulations in the 1960s brought with them increased work in contract archeology, or cultural resource management, but the most important of this work still consisted of reservoir salvage. In the 1960s and 1970s, a number of sites were

excavated at Kaw Reservoir, on the Arkansas River above Ponca City, including the Freeman (Os-59), Hudsonpillar (Ka-73), Vickery (Ka-42), and Von Elm (Ka-10) sites, plus additional work at the Bryson-Paddock site which Thoburn had excavated at in 1926 (Bastian 1969; Hartley 1974; Hartley and Miller 1977; Rohrbaugh 1974). Construction of Lake Oolagah on the Verdigris River in the late-1960s included excavations at the Lightning Creek (Nw-8) and Lawrence (Nw-6) sites (Baldwin 1969, 1970). Finally, work resulting from the construction of the Copan Reservoir on the Caney River yielded data on both paleoenvironments and a number of excavated sites (Henry 1977a; Howard 1970; Reid and Artz 1984b; Vaughan 1975; Vehik and Failec 1979). Other reservoir work included the proposed Shidler Reservoir in Osage County in the early 1970s (Neal 1973); while in the late 1970s, the University of Oklahoma, Department of Anthropology held field schools in the Salt Creek area of Osage County (Albert 1984:Table 2.2).

Within the immediate area of Mingo Creek, important work has been conducted at the Birch Creek Reservoir on Birch Creek in the mid-1960s and early 1970s (Barr 1964; Henry 1977b; Perino 1972), Skiatook Reservoir on Hominy Creek in the 1970s (Gettys et al. 1976; Henry 1977c, 1978, 1982; Rohrbaugh and Wyckoff 1969), and the proposed Candy Lake on Candy Creek north of Tulsa in the late 1970s (Leehan et al. 1977; Saunders 1980). In addition, a study of the Bird Creek Basin was conducted in the mid-1980s (Drass 1985), while a small-scale survey was conducted along Mingo Creek itself in the late 1970s (Cheek and Hays 1977). This latter work resulted in the recording of five prehistoric lithic scatters, four historic sites, and three isolated prehistoric finds, none of which were found in any of the building sites examined by this project.

As a result of these and other studies, a general cultural-historical sequence consisting of four major temporal divisions has been developed for northeastern Oklahoma. The earliest of these divisions is the Paleo-Indian period, dating from around 10,000 to 8,000 B.C. (Drass 1985:16). Remains of this period generally consist of surface finds of diagnostic projectile points (viz., Clovis and Folsom) which are presumably the remains of small groups of highly mobile hunter-gatherers. The evidence of kill-sites of large animals (i.e., mammoth and bison) further west has suggested to many researchers that these peoples were largely hunters of big-game animals. However, it is actually unknown whether they were "big-game-dependent" in the sense that historic plains bison-hunters were "bison-dependent" or whether they followed a more diverse subsistence economy, with only occasional use of big game resources. In the area of Mingo Creek, a Clovis-like point has been reported from near Hominy, northwest of Tulsa (Hofman 1971), several other fluted points have been found near the Arkansas River below Keystone Dam (Bell 1977), and one Folsom point was recovered from the area of Kaw Lake (George 1978). Later Paleo-Indian or Early Archaic points, such as Dalton, Agate Basin, and Scottsbluff have also been found in this area (Johnson 1989).

The subsequent Archaic period is dated from about 8,000 B.C to around A.D. 1 (Drass 1985:17-19). Throughout all of eastern North America, this general period is viewed as one of "settling in", meaning it is characterized by gradually increasing levels of population, less mobile settlement systems, less reliance on "big-game hunting", increasing use of local food and lithic resources, and a wider range of food resources utilized. In addition, in many areas there are technological introductions (e.g., ground and polished stone technology, possibly the atlatl) and stylistic changes (e.g., notched and stemmed projectile points). In regard to the environment, the climate became increasingly warmer and drier throughout this period, which probably explains, at least partially, the disappearance of many of the big game animals which appear to have been so important to previous Paleo-Indian groups. These environmental changes also undoubtedly played a role in the social changes which accompanied the Archaic period, but do not completely explain them. Drass (1985:17-19) lists only a few excavated Archaic sites within the north central Oklahoma area, including the Lawrence site (Nw-6) at Oolagah Lake (Baldwin 1969); several sites in the Copan Reservoir area including the Borrow Pit (Wn-104), Lovelace (Wn-105), and Lizard (Wn-107) sites (Artz and Reid 1984); the Hogshooter site (Wn-18) along the Caney River (Howard 1970); the Freeman (Os-59), Vickery (Ka-42), and Hudsonpillar (Ka-73) sites at Kaw Lake and along Lost-Duck Creek (George 1982; George

and Wyckoff 1980; Wallis 1980); and Pw-62 and Pw-63 south of the Arkansas River (Neal and Wheaton 1977). In addition, evidence of base camps, small temporary hunting/gathering camps, and workshops has been found at Skiatook Lake (Henry 1980), Candy Lake (Saunders 1980), and along Bird Creek (Drass 1985).

All of these sites appear to represent the remains of nonsedentary societies, which presumably moved within a limited, defined area on a seasonal basis. The Lawrence site (C-14 dated ca. 1510-760 B.C.) was apparently a seasonally-occupied base camp, with a subsistence base of hunting, fishing, and plant collecting, and a wide variety of dart points, chipped and ground stone tools, and some bone tools. The Hogshooter site appears to have been a seasonal hunting and gathering campsite with an assemblage consisting of dart points and chipped stone tools. Site Pw-62 is believed to have been a small, temporary campsite while Pw-63 may have been a temporary hunting camp, both dating between 4000 and 2000 B.C. and both having limited assemblages of dart points and chipped stone tools only. The Borrow Pit, Lovelace, and Lizard sites (all dated between 3510 and 80 B.C.) appear to be short-term, reoccupied hunting and/or gathering campsites with a few hearths or other features and very limited artifact assemblages. Some type of long distance contact was apparently important, since a variety of nonlocal chert materials appear in the lithic assemblages at many of the sites (e.g., Lawrence).

The artifact assemblages from Archaic sites include a variety of dart points (e.g., Marshall, Afton, Castroville, Williams, Palmillas, Ellis, Morhiss, Table Rock, Langtry, Montell, Gary, Calf Creek, Bulverde, Marcos, Ensor, Matamoros, Pedernales, Hanna, Dalton, Plainview, Meserve, Edgewood, Trinity-like, Carrollton-like, and Martindale-like), formal chipped stone tools (e.g., choppers, sidescrapers, endscrapers, core scrapers, knives, gravers, drills, and possibly Clear Fork Gouges), ground stone tools (e.g., manos, grinding basins, abraders, hammerstones, net weights, stone balls), and bone tools (e.g., awls). Features found at these sites have included rock-lined hearths, pits, and sandstone features.

The next period in north central Oklahoma has been referred to as the Woodland, and is a manifestation of what is known as a wider Plains Woodland tradition which covers central and north central Oklahoma, and south central Kansas (Drass 1985:19-22). This period is dated between A.D. 1 and A.D. 900, and is characterized by the appearance of the bow-and-arrow and pottery. Some form of horticulture may also have been introduced during this period, but it apparently did not become widespread until after A.D. 900. Drass (1985) notes that Woodland period sites are by far the most common in north central Oklahoma, and include Von Elm (Ka-10), Hammons (Ka-20), Vickery (Ka-41), and Daniels (Ka-77) at Kaw Lake (Hartley 1974; Rohrbaugh 1974; Young 1977); Pw-54 and Pw-92 in the Keystone Reservoir area (Moore 1980); and Weston (Os-99), Jackson Fall-Leaf (Wn-42), and Drumming Sauna (Wn-29) in the Copan Reservoir area (Farley and Keyser 1979; Howard 1970, 1971; Reid and Artz 1984a). Woodland sites consisting of base camps, small temporary occupations, rockshelters, and burned rock mounds have also been found in the Skiatook, Birch Creek, and Caney Lake Reservoir areas (Henry 1977b, 1977c, 1982; Saunders 1980), and along Bird Creek (Drass 1985).

As with the earlier period, these sites appear to represent a largely nonsedentary settlement system, with possibly seasonally occupied base camps on terraces and ridges adjacent to floodplains and more temporary logistical camps located in the uplands and bottomlands. The Drumming Sauna site at the Copan Reservoir did contain evidence of circular, semisubterranean houses with pits and hearths both inside and outside, but it may have been only occupied during the winter (Reid and Artz 1984a). Another site type identified at the Copan Reservoir consists of low mounds of burned rock, possibly related to plant processing (Drass 1985:20). The subsistence base appears to been largely oriented toward the hunting of deer, bison, turkey, rabbits, and other small game; fishing; and the collection of mussels, wild plants, and nuts. The Woodland artifact assemblage includes a few dart points (e.g., Gary, corner-notched points), arrow points (e.g., Scallorn, Reed), pottery (both plain and cord-marked), flake tools, scrapers, and ground stone tools (e.g., grinding basins, manos, and cupstones). Evidence of external contact includes Hopewellian-like sherds and cherts from eastern Oklahoma.

Drass (1985) refers to the final prehistoric period in north central Oklahoma as the Late Prehistoric period, and dates it between A.D. 900 and 1750. Sites dating to this period relate to the Plains Village tradition which is characterized by an increased reliance on cultivated plants in conjunction with bison hunting, increased sedentism with permanent hamlets or villages, and large villages. Drass (1985) points out that most of the better-documented sites in north central Oklahoma are located west of the Bird Creek drainage, and include Bowling Alley (Ka-131), Uncas (Ka-172), Deer Creek (Ka-3), and Bryson-Paddock (Ka-5) in the Kaw Lake area (Galm 1979; Sudbury 1968, 1976; Vehik and Flynn 1982). Within the Bird Creek drainage, Late Prehistoric remains have been identified in both the Birch Creek and Skiatook Reservoir areas and along the main branch of the creek (Drass 1985; Henry 1977b, 1977c, 1978, 1980). They include several caves or rockshelters used as transitory campsites, small upland camps, and probably seasonal base camps located on terraces.

The Late Prehistoric settlement system appears to consist of semipermanent base camps and permanent or seasonally reoccupied villages with permanent structures on terraces and floodplains, with numerous associated small hunting camps, and sometimes rockshelters, in surrounding areas. Bowling Alley and Uncas are small, at least semipermanent, village sites with houses, burials, bell-shaped and cylindrical pits, and hearths. The Deer Creek site appears to be a larger village with trash mounds, shallow depressions, and a large circular rampart apparent on the surface, and it has been suggested that both this site and Bryson-Paddock are early Wichita villages (Drass 1985:23).

Houses associated with the Late Prehistoric period are generally square with rounded corners and four center posts. Subsistence activities apparently included corn horticulture; the hunting of bison, deer, beaver, cottontail rabbit, raccoon, turtle, and turkey; fishing; mussel collecting; and the collection of sunflower and goosefoot seeds. The artifact assemblage of this period included characteristic arrow points (e.g., Fresno, Washita, Harrell, Haskell, Scallorn, and Sequoyah), formal chipped stone tools (e.g., diamond-shaped beveled knives, endscrapers), ground stone tools, bone tools (e.g., bison scapula hoes), and both plain and decorated pottery (including grit and shell temper).

The last of the indigenous aboriginal groups in north central Oklahoma appear to have abandoned the area in 1750, when the Wichita moved south to the Red River under pressure from other aboriginal groups to the north and east. Prior to this, the indigenous groups were in contact with French and English traders, either directly or indirectly, to the east and south. Euroamerican presence in the area began to be strongly felt in the early nineteenth century when a number of American expeditions travelled up and down the Arkansas River Valley, passing through or near the Tulsa area, including James B. Wilkinson in 1806, Thomas James in 1821; Washington Irving in 1832, and Nathan Boone in 1843. The area north of the Canadian River was formally ceded to the United States by the Osage in 1825 and in treaties of 1828, 1832, and 1833, the Creeks and Cherokees ceded their lands in the east and agreed to be removed to this area, then known as Indian Territory. What is today the Tulsa metropolitan area lay on the boundary between the Cherokee to the north and the Creeks to the south (Morris et al. 1976).

At the end of the Civil War, new treaties were negotiated with all of the Five Civilized Tribes (i.e., Choctaw, Chickasaw, Creek, Cherokee, and Seminole), including provisions allowing for the construction of railroads across all of the Five Nations' lands. As a result of this, the Atlantic and Pacific Railroad began building a line southwestward to the Creek Nation from the northwestern corner of the Cherokee Nation in 1871. It reached Vinita in September of that year and then stopped. In 1882, the St. Louis and San Francisco Railroad (successor to the Atlantic and Pacific) extended this line to the southwest into the Creek Nation to Tulsa. Tulsa had been founded as a Creek Indian village prior to the Civil War, and the first post office there was established in 1879. When the railroad reached Tulsa in 1882, a terminal with a roundhouse and loading pens was built and large herds of cattle began to be shipped north to Kansas City, St. Louis, and Chicago. In 1890, the area west of the Five Civilized Tribes was formed into the Oklahoma Territory, and in 1906 President Theodore Roosevelt signed the Enabling Act which provided for the creation of a single state from the Oklahoma Territory and Indian Territory. In 1907, a new state

constitution was ratified and Oklahoma admitted to the Union, with Tulsa designated as the county seat of Tulsa County. Since then, Tulsa has continued to grow and has become the largest urban center in northeastern Oklahoma and the second largest city in the state (Morris et al. 1976).

METHODOLOGY

As noted above, field inspection of the four potential building sites was carried out by a single archeologist on July 11, 1991. The procedure involved locating the approximate site of the proposed construction for each of the four sites. For this purpose, GMI had been furnished with a xerox copy of a Tulsa street map showing the general location of the four sites, verbal descriptions of the intersections near which the sites were located, xerox copies of six to eight photographs of each construction site area, and initial architect's plans for the potential final building or (in one case) a property plat. In three of the four cases, this information enabled the archeologist to located (a) the block on which the property was located, (b) the exact spot at which the photographs were taken, and (c) the exact location of the proposed construction. However, in the case of Site #2, the description, street map, and photographs were too general and did not match, while the architect's plan bore no landmarks relatable to the present area. As a result the building site could be located only to within an approximately 120-acre area. Also, in the case of Site #9, no architect's plan was available so the exact building site could be located only to within about a 15-acre area.

Once the potential construction site was located as well as could be, it was carefully walked over, paying special attention to soil type, surface topography, drainage pattern, vegetation cover, surface and drainage modification, contextual integrity, and subsurface stratigraphy. Extensive notes were made on all of these observations and the area was photographed again with special attention to these variables. Given the time of the year (i.e., the dryness and the heat) and the nature of the surface soils (i.e., silty clays), shovel testing proved to be too costly in terms of time and energy, so careful attention was paid to existing exposures for data regarding subsurface sediments. Such existing exposures included open utility trenches, creek cutbanks, and eroded areas. Areas which could be defined as having a high site probability (i.e., terraces adjacent to the floodplains of streams and rises or knolls above water sources) were also carefully examined, although not shovel tested for the reasons given above.

RESULTS OF SITE INSPECTIONS

As a result of the field inspection, no cultural resource properties were identified on any of the four potential building sites examined. In addition, surface conditions on portions or all of some of the sites indicate that no cultural resources would be located on some of the sites, even with a heavier investment of time and labor. However, other data suggests that backhoe work would prove productive, at least in regard to increasing our understanding of the paleoenvironment of the Tulsa area, and possibly in regard to locating buried cultural resources. The following paragraphs discuss each of the four potential building sites in order.

Site #1

This site is located at the northwest intersection of I-44 and Mingo Valley Expressway (Figure 2). The site is trapezoidal in shape and covers approximately 20 acres. The northern half of the site is occupied by a fenced-in area containing four baseball diamonds complete with backstop fences. Both infield and outfield areas are covered with short grass and maintained. South of this is an area about 20 m wide which is set aside for parking. This area is bare and covered with a gray silty clay and sparse limestone gravel. South of this is an area of tall grass grading to floodplain thicket, and a small portion of an unnamed tributary of Mingo Creek crosses the extreme southern portion of the tract. The site itself is a minimum of 300 m east of Mingo Creek. The surface of Site #1 is flat with no identifiable topographic rises or other features, although one quite prominent rise is visible to the west of the tract, closer to Mingo Creek.

The creek on the southern edge of Site #1 is incised about 2 m below the surrounding ground surface. Its present floodplain appears narrow, and although there is some evidence of wetting and drying further north of the creek, this may not be the result of creek flooding. The area within 10 m of the creek on the north side consists of a slight levee rise right next to the creek, then a low area, and then a higher bench which is probably the upland surface. The levee and low area behind it are covered with brown silty loam, while the bench is covered with a dark gray loam. The Tulsa County soil survey (Cole et al. 1977) identifies the soil within the floodplain as Radley soil -- nearly level silt loam soils on floodplains. The area of thicket surrounding the creek has a few tall hardwood trees, with a dense understory of greenbriars and other vines, saplings, and various forbs. Ground visibility was almost zero and the density of the undergrowth was almost impassable in most of the area. Further away from the creek and the thicket, the soil is a hard gray silty clay, almost impossible to penetrate with a shovel, and characterized by large surface cracks (presumably due to a high shrink-swell potential). The Tulsa County soil survey (Cole et al. 1977) identifies these soils as belonging to the Okemah-Parsons-Carytown complex, 0 to 1 percent slopes -- nearly level silt loam soils on smooth uplands.

Directly across Mingo Road, to the west of Site #1, a small open utility trench allowed a view of the subsurface sediments next to the creek (Table 1). One paleosol, about 95 cm below present ground surface, was identified within this trench, overlain by presumably alluvial deposits of silty clay and sand. It is tempting to suggest that this is equivalent in age to the Copan-related paleosol present along the Bird Creek Valley, dated sometime between A.D. 1 and 1100, possibly within the interval from A.D. 400-900 (Drass 1985).

Site #2

This site is located at 51st Street South and Garnett Road (Figure 3). As noted above, the exact location of this potential building site could not be located more exactly than somewhere within an approximately 120-acre block. Unfortunately, not all of this 120 acres could be inspected in the time allowed, so the inspection was concentrated on the southern and central portions of the area, where the available photographs and the address suggested that the building site was located. The 120-acre block is traversed

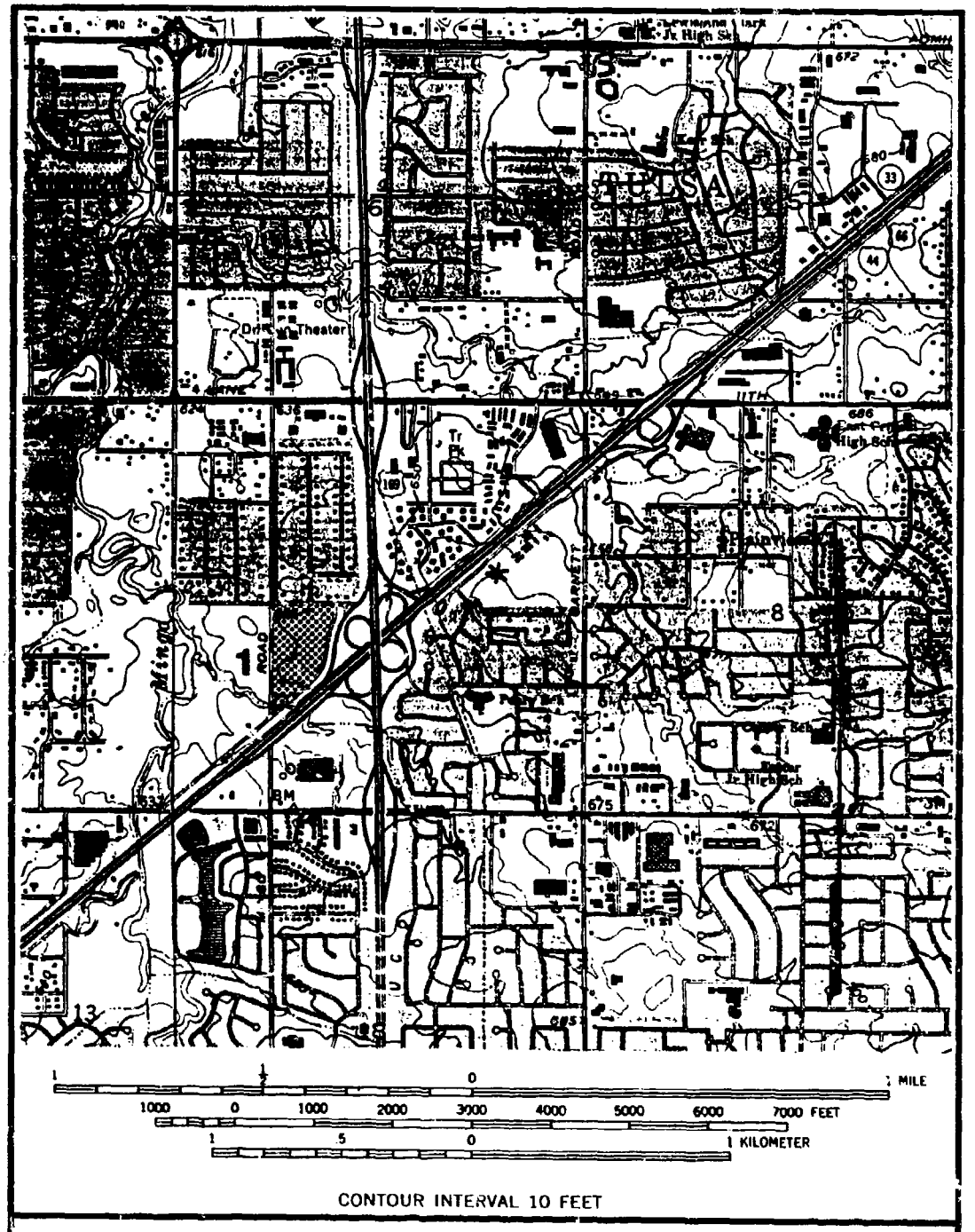

Figure 2. The upper portion of Mingo Creek, showing potential building Site # 1.

TABLE 1.

Subsurface Strata Observed Adjacent to Site #1.

Zone 1	0-20 cm bs	a very dark gray silty clay topsoil (10YR 3/1) with what appeared to be a blocky structure and yellowish brown mottles (10YR 5/6). [AC horizon]
Zone 2	20-80 cm bs	a grayish brown sand (10YR 5/2) which appeared to be structureless and was mottled with light brownish gray (10YR 6/2). [2C1]
Zone 3	80-95 cm bs	a dark gray, hard clay or silty clay (10YR 4/1) with a blocky structure and sand coated peds. [2C2]
Zone 4	95-110 cm bs	a very dark gray clay or silty clay (10YR 3/1) with a block structure and sand coated peds. [2A horizon]

All of the observed zones were characterized by iron staining.

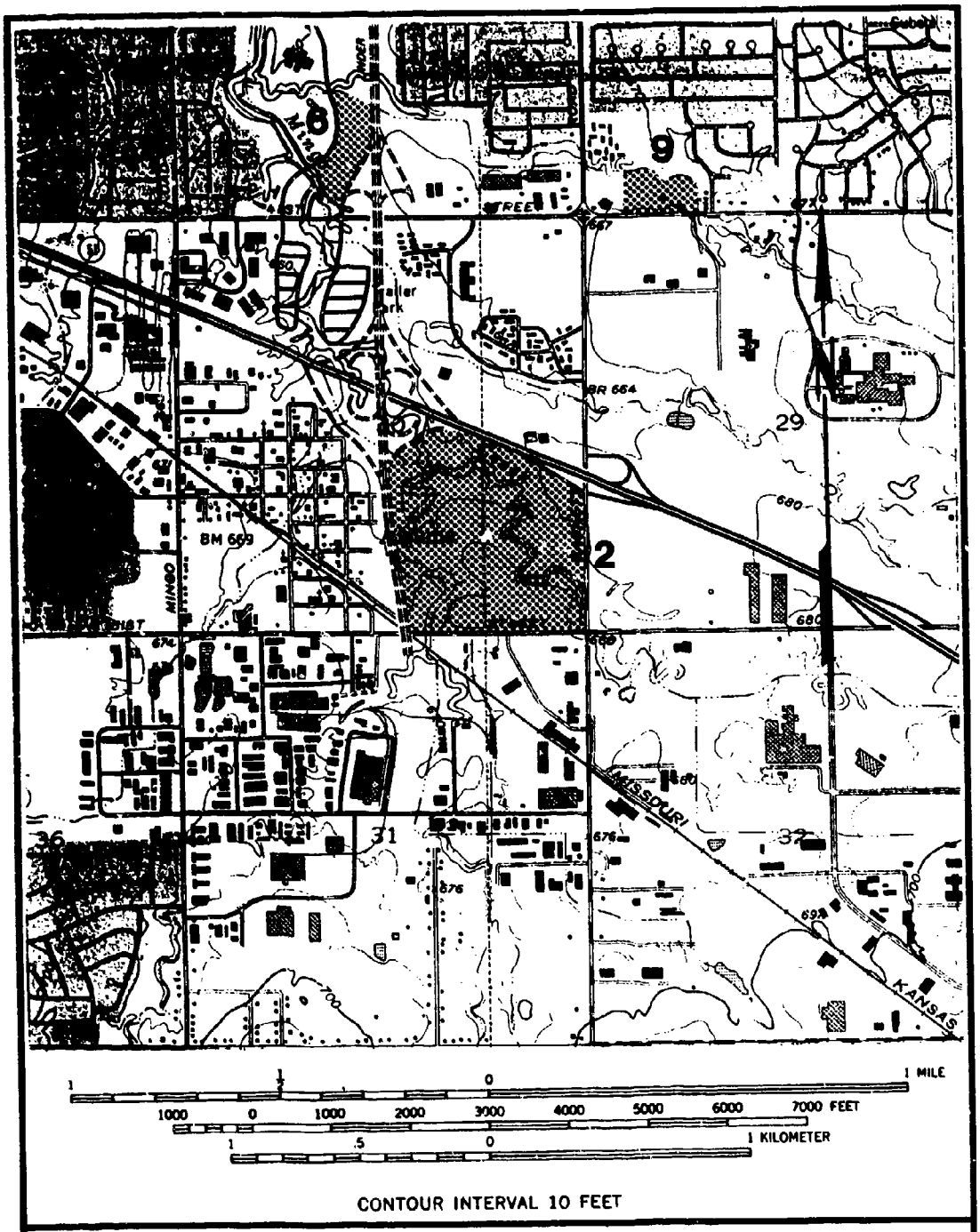

Figure 3. The upper portion of Mingo Creek, showing potential building Sites # 2, # 6, and # 9.

from the southeast corner to the northwest corner by Mingo Creek, while a smaller, unnamed tributary flows from south to north along the western boundary of the 120 acres to join with Mingo Creek on the northwest corner. This tributary has apparently been completely channelized and straightened to form a drainage channel which now flows east of the Mingo Valley Expressway. Portions of Mingo Creek have also been diverted and channelized as well, with the portion of the creek in the northwest corner of the block being diverted south and west of the Broken Arrow Expressway-Mingo Valley Expressway interchange and the portion of the creek in the southeast corner of the block being diverted through a concrete-rivetted channel which runs under the 51st Street-Garnett Road intersection.

Much of the surface of this block appears to be disturbed. A large mound of spoil dirt, possibly relating to creek channelization, is located in the southwest portion of the block, and the ground surface in this area shows no topsoil and a surface cover composed of clumps of sunflower and amaranth interspersed with tall grasses. The central area is largely covered with tall grasses, with some extensive areas of fallow wheat. Fallow wheat also covers large areas of the southeastern and eastern portions of the block, and possibly the northwest corner, and old plow furrows were still visible in the south central area. The surface soil over much of the area consists of clay or silty clay, with extensive drying cracks. The Tulsa County soil survey (Cole et al. 1977) identifies the upland soils located away from the creeks as either of the Okemah-Parsons-Carytown complex or of the Dennis-Carytown complex -- the latter being gently sloping silt loam soils on upland side slopes. The soils within the floodplain of Mingo Creek and its tributary are classified as belonging to the Dennis-Radley complex along Mingo Creek -- silt loam soils on floodways -- and Radley soil along the tributary. Much of the unchannelized portion of Mingo Creek is enclosed by a dense woodland thicket which made it difficult to get down to the creek channel itself, but a cutbank adjoining the channelized portion of the creek did reveal a portion of the subsurface stratigraphy, which showed only clay or silty clay (Table 2).

Site #6

This site is located at 3845 South 103rd East Avenue (see Figure 3). It is an irregular polygon, covering approximately 12.5 acres, and is an open field, covered with grass which had been recently cut at the time of the inspection. The site is bounded on the southwest by Mingo Creek and on the north by an unnamed tributary of Mingo Creek. Both of these drainages have been straightened and channelized. The northern tributary may have been moved as much as 100 m south of its original channel. The surface of the site appears to have been modified and landscaped. Prior to this surface modification, the majority of the site was classified as being covered with Okemah-Parsons-Carytown complex or Dennis-Carytown complex on flat or gently sloping uplands, with floodplain soils (i.e., Radley soils and Wynona silty clay loam) confined to a small area adjoining Mingo Creek on the south (Cole et al. 1977).

On the southwestern edge of the site, Mingo Creek flows on a bedrock channel which consists of gray shale (10YR 5/1 or N5/0). Above this in the cutbank, is an 80 to 100 cm thick deposit of dark gray clay (10YR 4/1) containing dark yellowish brown ironstone gravel beds (10YR 4/6). Above this in turn is a blocky gray clay (10YR 5/1) with yellowish brown iron staining (10YR 5/6) for about 150 cm to the top of the cutbank exposure, with present ground surface still several meters higher. Further south along this exposure an area of white sand with brownish yellow iron staining (10YR 8/1 with 10YR 6/8) was noted overlying the bedrock - possibly an old point bar deposit. Beyond these limited exposures, most of the bank of Mingo Creek, and all of the bank of its tributary to the north, was blanketed by fill which was used to grade the sides of the channel. The small tributary to the north also flows on shale. To the south of this channel is the level surface of Site #6. However, to the north is an artificial levee whose top is about level with the surface south of the tributary, but whose base on the side closest to the channel rests on a surface which is about 2 m lower. North of this levee the ground surface is about 4 m lower than the present surface of Site #6.

TABLE 2.

Subsurface Strata Observed in the Area of Site #2.

Zone 1	0-25 cm bs	a dark gray, hard, compact silty clay topsoil (10YR 4/1) with small flecks of dark yellowish brown (10YR 4/6), only minimal structure was observed. [A horizon]
Zone 2	25-75 cm bs	a massive, blocky dark gray clay (N4/0) with yellowish brown flecks (10YR 5/4) and well developed peds; gradual boundary. [C1]

The surface soil on Site #6 consists of a hard compact clay with heavy surface cracks, which is very difficult to penetrate with a shovel. Some large trees left standing on the south side of the site are in "wells", ca. 110 cm deep. These are large hardwood trees (i.e., pecan trees, about 80 cm across) which may indicate the level of original ground surface prior to landscaping. The present ground surface is relatively level. In the south central part of the site is a curving driveway of cement, with a large pile of sand blocking it before it ends. Railroad ties which are similar to those which retain the sides of the wells around the large trees to the south surround this sand pile. Beyond this sand to the north, the ground surface is blanketed with trucked-in limestone gravel, and beyond this is an east-west-trending, linear rise which appears artificial, with some cemented gravel on the other side. No other topographical features were present.

Site #9

This site is located at 11500 East 41st Street (see Figure 3). The lack of any architect's plans for this potential building site precluded its exact identification, but the area of its location was narrowed down to within an area of approximately 12 acres. Site #9 is a relatively flat lot, covered by short to tall grass. A treeline highlights the location of an unnamed tributary of Mingo Creek on the northern and eastern edges of the site area. Ground visibility was generally zero. In what is believed to be the northwestern area of the building site, just south of the creek, is a large depression, which may be artificial (i.e., a drainage trench or a borrow pit) or which may be a former creek channel isolated by channel straightening. It is oriented generally east-west, appears to be linear shaped and squared off, is about 15 m wide by 75 m long, and is blocked off from the creek at both ends. The creek to the north and east of the site is small and shallow, and is more of a drainage ditch. The creek channel is not incised and it has no appreciable banks, although it does appear to have a wide, shallow floodplain whose limits correspond to the edge of the treeline and which is delimited by a slight drop in elevation.

The USGS quad map of the area shows that one house and one outbuilding were located in the area in 1955, but they are no longer present. The apparently former house site is today revealed only by the presence of several large cedar trees on the east side of the area, and one brick found beneath a large hardwood tree further north. The trees in this area mentioned above are in a roughly north-south alignment and may denote the eastern boundary of the potential building site, which could not be definitely located in the field. The actual area of the house location, close to 41st Street, shows evidence of disturbance in the form of low earthen berms. Away from 41st Street to the north the ground surface does not look as heavily disturbed.

On the level surfaces away from the creek, the Tulsa County soil survey (Cole et al. 1977) identifies the soil as being of the Okemah-Parsons-Carytown complex, while the floodplain itself is covered with Radley soils. Away from the floodplain, the surface soil is a hard, compact dark gray silty clay (10YR 4/1) with brownish yellow mottles (10YR 6/8). Large surface cracks are present and a shovel will not penetrate the silty clay. An eroded area next to the large depression mentioned above, revealed an upper layer of dark gray silty clay (10YR 4/1) overlying a lower layer of very dark gray silty clay (10YR 3/1), which may be a buried soil, at approximately 25 cm below ground surface. However, the difference may only be one of moisture content, since the lower level appeared to be slightly moister and was less compact, and the exposure was too shallow to clearly identify the darker zone as a buried soil. The floodway along the creek was covered by a gray silty sandy loam (10YR 5/1).

RECOMMENDATIONS FOR ADDITIONAL WORK

Based on the results of the inspections conducted of the four potential building sites in Tulsa, Oklahoma, the following recommendations for additional work to be done are made. The additional work for each site should be done only if that site is selected as the final building site.

Site #1

Based on the site inspection, it appears that the central and northern portions of this site have no potential for containing any significant cultural resources, since the surface of these areas have been disturbed by present land use and they do not appear to be alluvial in origin. The southern portion of the site is a different matter, since the area immediately next to the small creek shows at least 110 cm of alluvial deposition and at least one paleosol, ca. 95 cm below present ground surface, which may relate to the Copan paleosol, and date to the Woodland period. In addition, although the chances of cultural resources on the present surface are slight, they cannot be discounted. Therefore, if this site is selected, it is recommended that a limited amount of subsurface backhoe investigations be conducted adjacent to the creek, and that this work be carried out during a time of year when ground cover is sparse, and shovel testing of this southern area is feasible.

Site #2

Although this site could not be located exactly, the site inspection indicates that with the exception of areas immediately adjacent to the creeks (or to the former creek channels), this site has no potential for containing any significant cultural resources, since the surface of almost the entire 120-acre block appears to have been disturbed by recent land use and most of the soils do not appear to be alluvial in origin. However, the areas immediately adjacent to the creek may have buried cultural resources or buried land surfaces. In addition, although the chances of cultural resources on the present surfaces next to the undisturbed portions of Mingo Creek are slight, they cannot be discounted. Therefore, if this site is selected and if it is adjacent to an unchannelized portion of creek, or a previous creek channel, it is recommended that a limited amount of subsurface backhoe investigations be conducted adjacent to any undisturbed sections of creek or former creek channel, and that this work be carried out during a time of year when ground cover is sparse, and shovel testing of this creekside area is feasible.

Site #6

Based on the inspection of this site, it appears that the present ground surface is the result of recent filling and grading, and that the original, older ground surface may be anywhere from one to four meters deep. Obviously, under these conditions no significant cultural resources will be present on the surface of the ground, but it is also significant that trenching with a backhoe would probably be of limited utility given the possible thickness of the apparent fill layer. An additional consideration is that the depth of any potential buried cultural resources would be great enough to prevent their being disturbed by anything other than major basement excavation for a large building. As a result, it is recommended that should Site #6 be selected as the final building site, no further cultural resource investigations would be required.

Site #9

The inspection of Site #9 revealed a relatively level upland area with a small, unincised creek on its northern and eastern edge. While the creek does have an identifiable floodplain, the channel is narrow, the creek bed is unincised, and the water flow was minimal. As a result, the site appears to have little potential for significant buried cultural resources. Likewise, the surface of the site appears to have suffered from varying degrees of disturbance and gave no evidence of any preserved cultural resources. As a result,

it is recommended that should Site #9 be selected as the final building site, no additional cultural resources investigations would be required.

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